# NOTES FOR CURSOR

Programs for PET™ Computers

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## A CURSORY GLANCE

There's a new price list out from Commodore that includes some of the new products we've all been wondering about. The new 80 column Pets will be called the CBM 8016 and 8032. These machines cost $1,495 and $1,795 respectively, or about $500 more than their 40 column cousins. There are two major differences: the display screen presents twice as much information as the 40 column model, and you can define a text 'window' where all scrolling occurs. For example, you can define a 'window' that begins on line two, and includes the rest of the screen. This would let you have a one-line status display which would not be affected by your normal printing in a Basic program. There are a couple of other enhancements, including the ability to insert and delete lines, and to erase to the end of a line. (These are useful in a program. They are not directly available from the keyboard.)

The other big news is the 8050 disk which gives you over 950K characters of storage on two 5 1/4 inch mini-floppies. Price:$1,695, or $400 more than the current 2040 disk, which has 341K net storage capacity. I haven't used the new disk unit yet, but from what I've heard it should be a good unit. They are using Micropolis drives, which have a solid reputation and have been well proven. Obviously, the additional storage capacity is very important in many serious applications. However, if you don't need the extra storage, the 2040 is quite a bit less expensive, and since it has been upgraded it is very reliable. As you may realize, disks written on one unit can't be read by the other, as they use completely different formats. Commodore dealers will probably offer a disk copying service where they read 2040 disks and write 8050 disks, by using two different drives.

There are two other new items, also due for June, 1980 release: a CBM modem for $395 which lets you talk to timesharing systems, such as the Source and MicroNet at 30 characters per second. There is also a Voice Synthesizer (for $395) which uses 'phoneme synthesis' to produce speech.

The major competition that these new cmputers from Commodore face is the Radio Shack Model II, which is an impressive computer for business applications if you buy the CP/M operating system. With CP/M you have immediate access to a wide range of application programs, as well as languages. On the other hand, the new CBM 8032 is in some ways a nicer machine than the Trash II, and at $3,500 with the 8050 disk, it is more than price competitive. The 8016 or 8032, combined with the 8050 disk and the 2022 printer is an excellent business system.

Other notes: COMPUTE is the new magazine published by Robert Lock. After three issues, my opinion is that COMPUTE is here to stay, and that every Pet/CBM owner ought to subscribe. It is only $9 for six issues, and you'll find lot's of Pet material in each one. As you know, COMPUTE took over Gene Beal's Pet User Notes (which always had good information), as well as Len Lindsay's Pet Gazette, and Eric Rehnke's 6502 User Notes. Robert Lock seems to have a vision of a user-oriented 'resource' magazine that is bound to come true, given its performance so far. You can subscribe by writing: COMPUTE, Box 5119, Greensboro, NC 27403.

CURSOR 18 HAS THESE PROGRAMS: (Names ending with '!' use CB2 sound)

| | |
|---|---|
| COVER18 | Stacking Blocks - a graphic design by Peter Stearns. |
| DROMEDA! | The Cursor Creature Feature, a cartoon in living black and white. By James Carr. |
| JOUST | Computers in the Middle Ages? Well, put on your armor and challenge a friend to a joust. Brian Sawyer. |
| WEATHER | Predict the weather? Dr. Randall Lockwood wrote this very useful program. |
| HI-RES | Who says you can't do high resolution graphics on a PET? HI-RES gives you dot-by-dot control over a section of your screen! By Dave Dixon. |
| SHEEP | Herd the sheep into the barn before they eat the crops. By Peter Stearns. |

## MORE ABOUT THE PROGRAMS

DROMEDA!... There isn't much to say about this excellent animated cartoon by Bob Carr. Except that you must have CB2 sound to get the full benifit! (Many people don't realize how powerful character graphics can be.)

JOUST... This two-player game lets each player control a lance and a shield as they ride toward each other. The objective is simple: each player tries to knock the other to the ground. The player on the right types [7] to move his lance up, or [1] to move the lance down. The player on the right presses [9] to move his shield up, and [3] to move it down. On the left, the player uses [E] to move the lance up, [C] to move it down. [Q] moves the left player's shield up, and [Z] moves it down. Note that a knight cannot hold the lance and shield at the same level. So, moving the shield to the level of the lance causes the lance to move out of the way. If both knights are unsaddled, or neither knight is unsaddled, the round ends in a tie.

WEATHER... The WEATHER program is provided as an example of how the Pet may be able to help you predict the weather. We make absolutely no claims that it is accurate or correct. With this program and a barometer you can experiment with comparing your predictions with those of your local radio or TV station. You'll need two barometer readings separated by 6 to 23 hours, wind direction, temperature, and sky condition. From this information, the program gives a forecast for the weather for the next 6 to 24 hours. The author says it even predicted a snow storm that the local weatherman missed.

HI-RES... With HI-RES, you can control individual dots on the screen in a 9 character by 5 character area. As you are probably aware, you can write a program that changes the characters on the screen fast enough that your eye sees them both at the same time. HI-RES works in a similar way, except that it changes the characters faster than the Pet can redraw the screen. In other words, while the Pet is drawing one line of character dots, HI-RES is changing the characters in the screen memory to a different set, so that the next line of dots come from entirely different characters.

Thus, each line of dots within a character square can come from a different character. The way HI-RES works also forces a limitation on what you can draw with it: you can't put up a line of dots that doesn't come from some existing Pet character. Also, the screen redrawing is fast enough that HI-RES can only work on an area 9 characters wide by 5 character high. (One line of dots is displayed in a little less than the time HI-RES can change 10 characters. That is why a limit of 9 characters: the tenth would be progressively chopped short. Also, after 5 rows of characters, the ninth character is being eaten into, so the HI-RES display can only be 5 row high.) Those of you with old Pets will see a lot of 'hash' on your screen, due to the great speed with with HI-RES is changing screen memory (just like when you POKE the screen a lot). The new Pets are built so that changing screen memory doesn't make the 'hash'.

When HI-RES starts, it will display a sample of what you can do with it in the 9x5 area, and then print a prompt of '>'. There are six commands you can give it: Horizontal line, Vertical line, Fill area, Plot character, Spread character, and Quit. Here is how the commands are typed. (Note that brackets indicate that the item is option. Do NOT type the bracket!)

```
H pos [+step] length char
V pos [+step] length char
P pos char
F char
S pos char
Q
```

Positions are indicated by a row/column position. Rows are individual lines, within a character, so that there are eight rows per character. There are forty rows, numbered from 0 to 39. Columns are one character (eight dots) wide. There are ten columns, numbered from 0 to 9. To name a position, type its row and column, run together. For example, row 5, column 4 would be typed 54. Row 23, column 0 would be 230. The tenth column is not shown on the screen, since HI-RES can't quite change things fast enough, but there IS a tenth column.

The length of a line is how many positions will be changed. If twenty-three changes are made by a line, the line is 23 positions long. The 'step' of a line tells how many positions to skip between changes. A step of 2 changes every other position, and a step of 10 changes every tenth position.

A 'char' is the character you want put on the screen. If you want an asterisk, type a '*'. For a bracket, type '['. If you want a reverse-video character, press [RVS], and then type the character.

H (horizontal) draws a horizontal line made up of one character. If the line goes off the right edge of the 9x5 rectangle, it will reappear at the left, one row down.

V (vertical) draws a vertical line made up of one character. If the line goes off the bottom, it will reappear at the top, one column to the right.

P (put) puts the character in a specific position on the screen, and only there.

F (fill) fills the entire rectangle with the character chosen.

Q (quit) stops the HI-RES program, and puts everything back where it should be. If you break out of HI-RES (with [STOP]), things will be left in an odd state. In that case, type SYS ML to clean things up.

S (spread) lets you see the separate lines making up a character. It always changes eight entire rows. Column 0 is filled with the complete character. Columns 1 through 8 get one line of the character per column, with the rest of the column blank. This lets you see how the dots in one line of a character look, without being confused by the dots on other lines.

Some examples:

```
H 43 4 *
```

draws a horizontal line starting at row 4, column 3, going right four columns. The line is made of *'s (rather, lines of dots from the * character).

```
F [RVS]
```

makes the rectangle completely white.

```
P 390 =
```

puts one line of dots from an equals sign into row 39, column 0 of the rectangle.

```
V 100 +3 5 #
```

draws a vertical line downward, starting at row 10, column 0. Only every third position is modified, and five positions are modified. The positions are filled with dots from the #.

You can make a number of interesting patterns easily with HI-RES. Once HI-RES is running, give the following commands:

```
F [RVS][shift-Z]
V 0 +2 999 [shift-Z]

F [RVS]+
V 0 +2 999 +

F [RVS][shift-V]
V 0 +2 999 [shift-V]
```

SHEEP... Your faithful sheepdog Shep will help you herd the sheep into the barn. You control Shep with the numeric pad. A sheep moves randomly until Shep gets near. Then it moves away from the dog, and keeps moving until it is out of his vicinity. Get all of the sheep into the barn as quickly as possible. But keep them out of the crops! The sheep eat the crops, but Shep is not allowed to step on a plant.

## THE OFFICIAL COMMODORE ROM GENEALOGY

**The PET/CBM computer has been around now for over two years, and like all products, it has 'matured'. Translated, that means there have been changes, especially in the important system software that is stored in the Read Only Memory, known as the ROMs. Recently, I discovered that one of the ROMs in our old 8K Pet had a different 'dash number' than more recent 'old 8K Pets'. I called Chuck Fowler who is the Director of Customer Support at Commodore, and discussed the ROM part number situation with him. He agreed that it would be a good idea to put together a definitive list of the ROMs. So, Dave Jackson, a Senior Technician who works with Mr. Fowler compiled the list which we present here. Please note that there is a fairly important change in the ROM for the 2022 and 2023 printers. The new ROM, part number 901472-04, provides significant improvements in the performance of the printer. If you have a pre-December, 1979 printer, chances are you'll need the new ROM. The best news is that Commodore (after some prodding by Chuck Fowler) is providing the replacement printer ROM at no cost! See your authorized Commodore dealer to get the new ROM.**

When the "PET 2001" first went into production September, 1977, there were two ROM Sets incorporated into the system. One ROM Set is the 6540 type ROM. This is a 28 Pin ROM which is manufactured by MOS Technology, Inc. You will find these ROMs in the following locations on the PET 2001-4 and 2001-8 Main Logic Board:

| Location | ROM | Part Number |
|---|---|---|
| H1 | 6540-019 | 901439-09 |
| H2 | 6540-013 | 901439-02 |
| H3 | 6540-015 | 901439-03 |
| H4 | 6540-016 | 901439-04 |
| H5 | 6540-012 | 901439-05 |
| H6 | 6540-014 | 901439-06 |
| H7 | 6540-018 | 901439-07 |
| A2 | 6540-010 | 901439-08 |

Note: There is an 019 ROM at the H1 location. On some earlier Main Logic Boards you will find a 6540-011 at H1. This ROM has been updated to an 019 due to an intermittent bug in the edit software. This ROM Set is Basin Level I.

The other ROM Set incorporated into the PET 2001 is a type 2316B 24 Pin ROM. You will find these ROM's in the following locations on the PET 2001-4 and 2001-8 Main Logic Board:

| Location | ROM | Part Number |
|---|---|---|
| H1 | 901447-09 | 901447-09 |
| H2 | 901447-03 | 901447-03 |
| H3 | 901447-05 | 901447-05 |
| H4 | 901447-06 | 901447-06 |
| H5 | 901447-02 | 901447-02 |
| H6 | 901447-04 | 901447-04 |
| H7 | 901447-07 | 901447-07 |
| A2 | 901447-08 | 901447-08 |

Note: There is an 09 ROM at the H1 location. On some earlier Main Logic Boards you will find a 901447-01 ROM.This ROM has been updated to an 09 ROM due to an intermittent bug in the edit software. Like the 6540 ROM Set, this too is a basic level 1 ROM Set. To determine what the 6540 and 2316B ROMs listed above are capable of, I would refer you to the "PET User Manual" Model 2001-8.

The next two ROM Sets are basic level II ROMs. They are also Retrofit Kits for the 2316 B and 6540 basic level I ROMs. The basic level II ROMs allow you to access machine language by using a SYS command. Basic level II allows you to interface the Commodore 2040 Dual Floppy to your PET. Basic level I ROMs will not allow you to interface the 2040 Dual Floppy to your PET. The basic level II Retrofit ROMs also clear up a bug in limiting the demensions.

If your PET has the basic level I 6540 ROMs, you would use the following ROMs which come in the form of a Retrofit Kit to upgrade your PET to basic level II.

| Location | ROM | Part Number |
|---|---|---|
| H1 | 6540-020 | 901439-13 |
| H2 | 6540-022 | 901439-15 |
| H3 | 6540-024 | 901439-17 |
| H4 | 6540-025 | 901439-18 |
| H5 | 6440-021 | 901439-14 |
| H6 | 6540-023 | 901439-16 |
| H7 | 6540-026 | 901439-19 |

If your PET has the basic level I 2316B ROMs, you would use the following ROMs which come in the form of a Retrofit Kit to upgrade your PET to basic level II:

| Location | ROM | Part Number |
|---|---|---|
| H1 | 901465-01 | 901465-01 |
| H2 | 901465-02 | 901465-02 |
| H3 | 901447-24 | 901447-24 |
| H4 | 901465-03 | 901465-03 |
| H5 | Blank | |
| H6 | Blank | |
| H7 | Blank | |

To determine what the basic level II Retrofit ROMs are capable of, I would refer to the "CBM User Manual" model 2001-16,16N,32,32N. Part number 320856-3.

The following ROM Sets are the ROMs that are currently being used in production. There are two sets of ROMs in use. If you have a graphic style PET, you should have the following ROMs in your unit:

| Location | ROM | Part Number |
|---|---|---|
| D3 | Blank | |
| D4 | Blank | |
| D5 | Blank | |
| D6 | 901465-01 | 901465-01 |
| D7 | 901465-02 | 901465-02 |
| D8 | 901447-24 | 901447-24 |
| D9 | 901465-03 | 901465-03 |
| F10 | 901447-10 | 901447-10 |

If your PET is a business style, you should have the following ROMs in your unit:

| Location | ROM | Part Number |
|---|---|---|
| D3 | Blank | |
| D4 | Blank | |
| D5 | Blank | |
| D6 | 901465-01 | 901465-01 |
| D7 | 901465-02 | 901465-02 |
| D8 | 901474-01 | 901474-01 |
| D9 | 901465-03 | 901465-03 |

The ROMs in the graphic and business PET are basic level II ROMs. Again, I would refer you to the "CBM Users Manual" model 2001-16,16N,32,32N. Part Number 320856-3

The ROMs currently being used in production of the 2040 Dual Floppy are as follows:

| Location | ROM | Part Number |
|---|---|---|
| UL1 | 901468-06 | |
| UK1 | Blank | |
| UH1 | 901468-07 | |
| UK3 | 6530-02 | |

These ROMs are at basic level II.

The 2022 and 2023 Printer went into production using a 901472-03 ROM at Location U11. This ROM has been updated to a 901472-04. By changing the 03 to 04 ROM, the following enhancement of features and error correction improvements were made:

1. Allow feed switch to generate a continous feed instead of 5 lines at a time (901472-03).
2. Head motor does not run when a Tractor Feed Printer performs a feed.
3. An extra carriage rtn. is no longer printed after the first line of print after power-up.
4. Cummulative cooling delay time added for reverse field characters.
5. Added secondary address 7 to latch Printer into default upper/lower case mode instead of upper case/graphics mode to work with PET business k/b.
6. An enhanced character printed in the first column position no longer loses the first dot column at random.
7. Auto line count adjusted to 66 lines per page default including the page eject control character. Line count was off by one line per page when compared to documentation and C-ITOH and practical automation software.
8. Corrections for the 6532 timer bug which caused overprinting (missed line feeds) on the friction feed version (90147-02) and were patched (901472-03) were assembled in line (901472-04).
9. In diagnostic mode the character set printed is the 64 character ASCII set instead of 64 characters and an extra blank.
10. In diagnostic mode, the ready light is lit after the RAM and ROM tests are passed. Thus if a bad mechanism is attached, more data is given about the nature of the board.